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2013

Diploma Programme subject in which this extended essay is registered: Economics

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Title of the extended essay: To What Extent Does the Relation between the Snowfall at Vail Resort and the Ticket Sales Resemble an Economic Model?

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## Assessment form (for examiner use only)

Criteria	Achievement level				
	Examiner 1	maximum	Examiner 2	maximum	Examiner 3
A research question	2		0	2	
B introduction	2		1	2	
C investigation	4		1	4	
D knowledge and understanding	4		1	4	
E reasoned argument	4		1	4	
F analysis and evaluation	4		1	4	
G use of subject language	4		1	4	
H conclusion	2		1	2	
I formal presentation	4		1	4	
J abstract	2		0	2	
K holistic judgment	4		0	4	
Total out of 36			8		

To What Extent Does the Relation between the Snowfall at Vail Resort and the Ticket  
Sales Resemble an Economic Model?

Economics

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## Table of Contents

Abstract.....	3
Introduction.....	4
Body.....	6
Conclusion.....	18
Bibliography.....	19

## Abstract:

This essay was an investigation of what extent can an economic model be based on the ski industry with supply represented as total snowfall and demand as the total number of tickets sold? Using data from Vail Resort, analysis showed that although there is no clear correlation between supply of snow and demand for tickets, there are still some underlying economic principles in Vail Resort. These include externalities of snowfall from previous seasons impacting the next season, the Law of Diminishing Marginal Utility, and the monopolistic traits of Vail Resort. Because of this, the economic model can be used to analyze long term effects of the market. Unfortunately this is skewed by the monopolistic implosions of prices by the resort itself. Useful information about yearlong attendance can be inferred from the externalities of the snowfall of previous seasons which can be used to better manage the resort and in the long run benefit both Vail Resort and the consumers. Other than the long term analysis of attendance data, the model predict on a short term scale the amount of ticket sales due to the amount of snowfall on a given day, week, or month.

## Introduction:

The ski industry often leaves visitors with a multitude of questions about money, the most common being "How did I spend fourteen dollars on a hot dog?" Aside from overpriced lunches, there is another interesting facet of the Colorado ski industry that nearly all of the visitors overlook. This is the idea of: is it possible to compare the actions of consumers coupled with the amount of snowfall to a useful economic model? These include many economic factors such as the effects of supply and demand, positive and negative externalities, and the elasticity of goods. Each of these factors is a crucial factor in an economic model of a standard business, which applies anywhere from the production of the new iPhone to North American logging, with the purpose of the model being for economists to reasonably predict the actions of the market based on given data.

The main issue in the application of the model to a ski resort is that the resort itself has relatively little control over the quality of its final product supplied to consumers. Compared to, for example, a car manufacturer such as Ford, which can control every detail of their product as it travels along an assembly line, a ski resort can only offer the best possible amenities and snow making equipment. Even after this, a ski resort must hope for as much help as possible from Mother Nature. This is the most intriguing part of this situation, and it begs to be investigated further, leading to the investigation of the relation between snowfall and demand for ski tickets at Vail Ski Resort. What makes this case interesting is that Vail cannot actively control the amount of natural snowfall that the resort receives, although the resort does have over 460 acres of snowmaking coverage on mountain (Stats and Facts). This is again an amenity

that the resort offers in hopes of helping their chances with the amount of snowfall that occurs naturally.

The laws of supply and demand are some of the most basic economic ideas, but in this essay they have some grey areas. The definitions to be used for this essay are as follows: Demand is the amount of a resource or good that the average consumer is willing to buy at a certain price, with an inverse relation between the price and the quantity demanded (O'Connor and Faille 31). O'Connor and Faille also define supply as the amount that producers are willing and able to sell at a given price, when there is a direct relation between price and quantity supplied (36). Throughout this essay the amount of snowfall at Vail will be the quantity of the good supplied by the producer and the number of ski tickets sold will be considered the quantity of that good that was demanded by the consumer at that point in time.



Body:

To compare the economic statistics of Vail Resort to a typical economic model, there are several basic economic functions that must be considered. Every functioning micro-economy has an inverse relation between supply and demand and externalities that affect both of these, as well as a free market structure and other economic principles. This essay will use these criteria to determine the validity of an economic model of the supply of snowfall and the demand of ticket sales at Vail Resort. By comparing what is expected from a typical free market economy to the data from Vail Resort, one can determine the legitimacy of the economic model as well as the implications that stem from the comparison.

The typical economic model of a given industry has supply and demand curves that are inversely related (O'Connor and Faille 31). It would stand to reason that the first step in determining the validity of the economic model of Vail Resort would be to determine the relation between supply of snow and the demand of ski tickets and to see if it would be similar to a typical economic model such as the production and sales of TV's. The first step in evaluating this economic model was to gather sales and snowfall data for Vail Mountain over the past five years.

Year	Total Mountain Revenue (thousands of dollars)	Tickets Sold	Max Base Depth (inches)
2011	342,514	1,750,000	51
2010	289,289	1,599,000	88
2009	276,542	1,622,000	75
2008	301,914	1,596,788	85
2007	286,997	1,608,204	81
2006	263,036	1,676,118	56
Sources	Vail Resorts 2011 Vail Resorts 2008	Stats and facts	Vail Historical Snowfall

Figure 1

It is obvious from Figure 1 above and the Figure 2 below that there is no clear economic relation between the amount of snowfall and the quantity of ski tickets demanded by visitors in any given year. From Figure 2 below, one can conclude that there is an issue

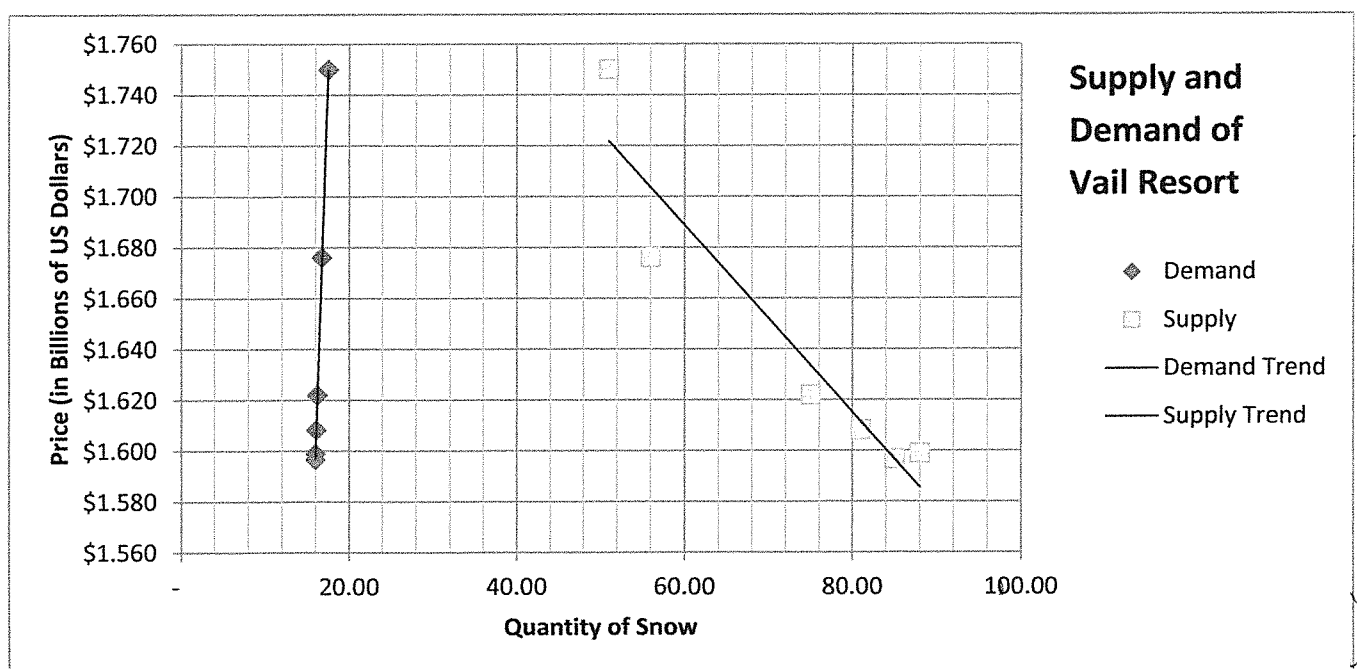


Figure 2

with the lack of an intersection between the trend curves for the supply and demand, but that will be addressed later. Also, there is no inverse relationship between the supply (snowfall) and the demand (ticket sales). For example, the year 2010 had 88 inches of maximum base snowfall and 1.59 million visitors, but the year before (2009) had only 75 inches of snowfall but had 1.62 million visitors. This shows that there is no direct correlation between the two variables, meaning that a larger amount of snowfall does not specifically preclude more ticket sales over the course of multiple ski seasons.

There are many things that must be taken into account when analyzing this data. These include possible externalities (which will be discussed in more depth later), inaccurate representation, and other issues outside the limits of *ceteris paribus*. In this example, *ceteris paribus* includes other outside factors that are not mentioned in the data. For example these might encompass: amount of snowfall at other; competing; resorts, road construction along the single major road to Vail Resort; I-70, economic downturn for the residents of the state in general, and even improvements made over the summer between seasons to the accommodations and amenities offered at the resort. For this data, the limits of *ceteris paribus* include only the amount of snowfall at the resort, the total ticket sales, and the total ticket revenue of the resort. From only this information and *ceteris paribus*, one can determine that the supply and demand of snow does not follow a typical economic model of supply and demand because the correlation of supply and price is inverted instead of direct and the correlation between demand and price is direct instead of inverse. Another error involved in the data from Figures 1 and 2 is that the statistic of maximum base snowfall can be misleading because

although it accounts for high levels of snowfall in a short period of time, it does not account for seasons with large, spread out snowfall. Although this data provides appropriate insight into the supply and demand relation of snowfall and ticket sales at Vail Resort, one must consider how well the snowfall data represents a total season's snowfall.

The next important issue in reviewing the validity of the economic model of the ski industry is the idea of externalities and diminishing marginal utility. O'Connor and Faille define a typical externality as "a side effect of an industrial or commercial activity that affects other parties without directly influencing the price" (47). An externality can have a positive or negative effect on the market for an item, depending on the cause. A good example of a positive externality is the market for wasp traps. If someone has a neighbor who has bought a wasp trap, hung it in his back yard, and in turn trapped all the wasps invading the first person's yard, would they feel the need to buy their own wasp trap? The answer is obviously no because there is no need because of the positive benefit provided by the neighbor's wasp trap, even though nothing was paid to receive the benefit. The same thing applies inversely if the neighbor got an old broken down car with terrible emissions. If, somehow the smog from the car caused a respiratory illness, that would be a negative externality. This would be because of its cost to society (illness) even though only one person owns the car.

The externalities mentioned earlier after the data from Figure 1 are similar to this. For example if one ski season gets a large amount of snow, many vacationers could reserve tickets for the next season, expecting the next season to have as much as if not

more as the previous season. This “positive year externality” explains the data from Figure 1 that does not correlate with the laws of supply and demand.

Year	Total Mountain Revenue (\$1000)	Tickets Sold	Max Base Depth (inches)
2011	342,514	1,750,000	51
2010	289,289	1,599,000	88
Sources	Vail Resorts 2011 Vail Resorts 2008	Stats and facts	Vail Historical Snowfall

Figure 3

The best example of the Positive Year Externality is the years in Figure 3 above. The snowfall in 2011 was 37 inches less than 2010, but the resort still managed to sell almost two hundred thousand more tickets than the previous year. The reverse is also true for a negative externality, which explains pairs of years such as 2006 and 2007

Year	Total Mountain Revenue (\$1000)	Tickets Sold	Max Base Depth (inches)
2007	286,997	1,608,204	81
2006	263,036	1,676,118	56
Sources	Vail Resorts 2011 Vail Resorts 2008	Stats and facts	Vail Historical Snowfall

Figure 4

Because 2006 had 25 fewer inches than the next year, potential skiers though twice about reserving tickets, thinking that the next season would be similarly disappointing as the previous season. These trends are consistent throughout the entirety of the data and helps explain why the supply and demand graph is skewed. Although this does not counter the somewhat overwhelming evidence from the supply and demand graph that

the economic model of a ski resort is not similar to a standard economic model, it does show that there is a possibility that outside interactions skewed the data. From this it follows that there is some legitimacy to the economic representation of Vail Resort snowfall and ticket sales.

The next factor that could influence the amount of ski ticket sales, outside of snowfall, is the idea of diminishing marginal utility. This is the idea that there is less utility (enjoyment) gained for each consecutive item purchased (O'Connor and Faille 53). An example of this is buying a donut. The first one purchased is highly enjoyable and the second one slightly less so, but by the tenth donut, most rational people are sick of them. This means that the utility gained from each consecutive donut diminishes to a point where it is no longer worth the cost of buying the donut. With respect to skiing, this idea may hold true, if there are more days in a ski season with high amounts of snowfall, consumers will be less likely to enjoy them as much as they would if there were only a few days with high snowfall. This could be a contributing factor to the data from 2011, which had the highest tickets sales (1.75 million) (Stats and Facts) but the lowest maximum snowpack with only 51 inches (Vail Historical Snowfall). Because there were less single days with high amounts of snowfall in the season, consumers gained more marginal utility from each one than they would have with many in one season. The opposite of this effect is also true in the year 2010. This season had 88 inches of maximum snowpack (Vail Historical Snowfall), but second lowest ticket sales at 1.59 million (Stats and Facts). The data shows a clear correlation between the number of quality ski days and the marginal utility that is experienced by the visitors. This also shows that there is a correlation between a standard economic model and the

model of Vail Resort, meaning that the supply and demand irregularities could have been caused by a source outside of *ceteris paribus*.

Finally there is the idea of how the average income of a consumer has affected the amount of tickets purchased from Vail Resort. Consumers only have a finite amount of income and economics assumes that they spend it wisely. Income must be prioritized to essentials such as food and housing. Only after this can consumers spend the remainder of their disposable income on luxury goods. With ticket prices nearing one hundred dollars for a day, skiing can be considered a luxury good. Comparing the change in Colorado unemployment levels and the amount of ski tickets sold at Vail shows that ski tickets are a normal good. This means that as unemployment goes up (and therefore average income goes down) ski ticket sales at Vail go down (see Figures 5 and 6 on the next page).

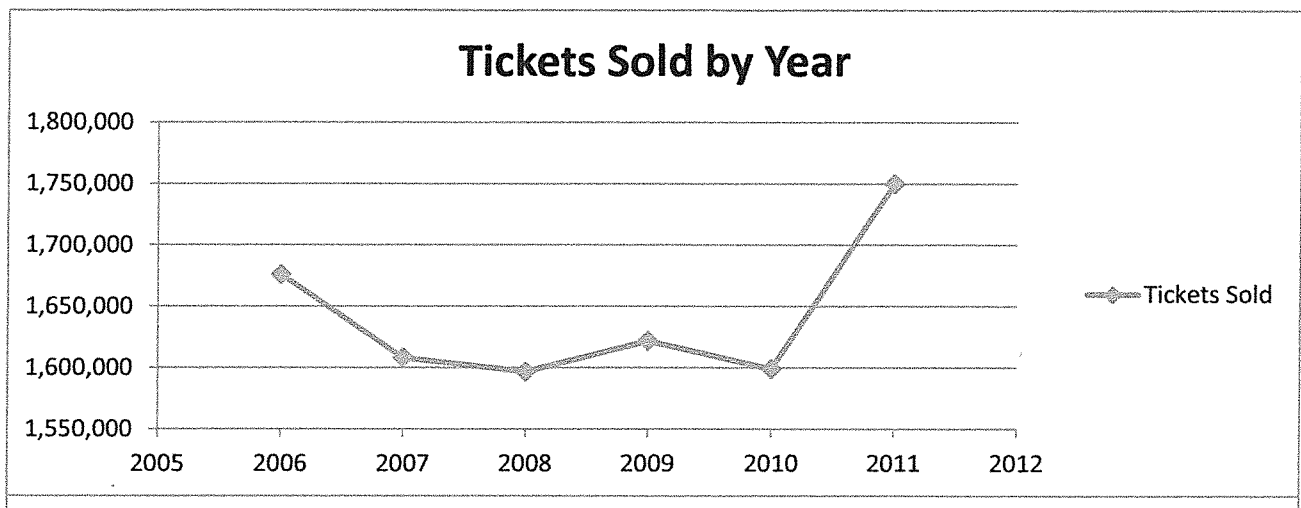


Figure 5

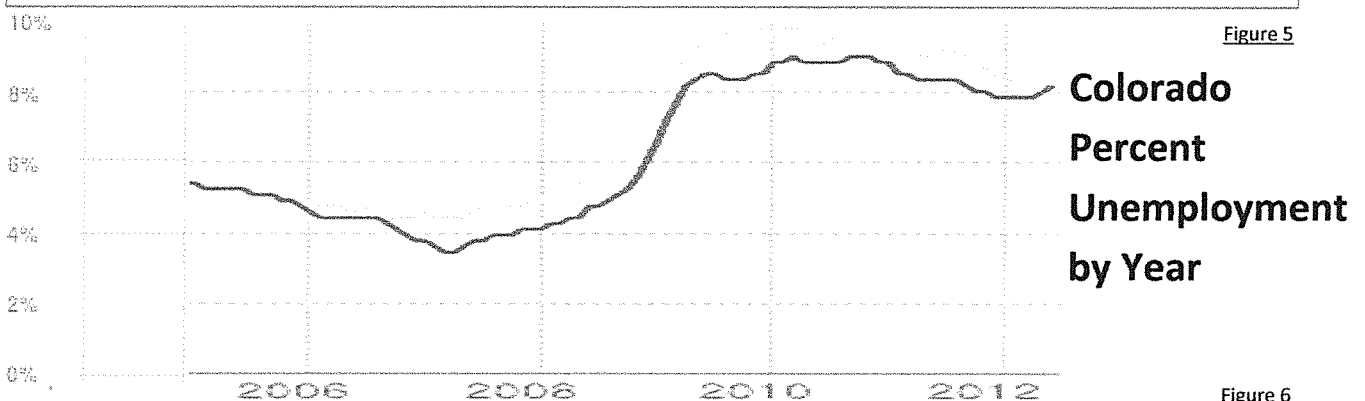


Figure 6

It is obvious from these graphs that there is a correlation between the rises in unemployment during the recent economic recession and the loss of ticket sales from Vail Resort. This also supports the idea of a basic economic model because this shows that the ski industry would be part of the circular flow model. As wages from the labor market to the households are cut, the households have less to spend on the ski resorts which in this case represent the product market. The only issue is that there is no real resource or labor market through which money and goods can flow through to. Although there is no proof that there is a basis of an economic model in the snowfall and ticket sales of Vail Resort, there are too many irregularities in the system to fully support the idea of an economic model.



The next way to analyze the Vail Resort's resemblance to a basic economic model is to analyze how well it fits in with the idea of a perfect market. As a capitalist nation, the United States is supposedly a perfectly free market. This means that there are no monopolies or oligopolies and prices are set by the market, not by government regulations (O'Connor and Faille 91-101). O'Connor and Faille define perfect competition as "a model market structure in which thousands of firms, acting independently, produce an 'identical' good to sell to consumers" They also continue to elaborate to the effect that supply and demand determine the price; not regulations (92). Even though this is not even true in a real world market, it is the goal of a free market economy. According to O'Connor and Faille, there are five main parts to perfect competition: A large number of buyers and sellers, identical products, easy entry and exit, small role of government, and no market power for individual firms (92-94). First of all, there are a disproportionate number of buyers and sellers in the skiing industry as a whole. There are millions of skiers every year at Vail (Vail Resorts 2011) and technically only one seller (not considering the other 20 or so major resorts throughout Colorado). This means that the consumer has little control over the price because there is only one option. Secondly, as anyone who has ever skied more than once will say: no resort is alike; making it difficult to compare the products offered by each resort. This doesn't particularly matter in the case of Vail Resort, but relaxing *ceteris paribus* it is important to analyze the entire industry in this manner to see how the consumer has almost no control in any place in the ski industry, including Vail Resort. Next, the biggest problem is the issue of easy entry and exit from the market. Starting with entry, a ski resort is a huge investment and takes years of construction and government

approval to use national forests. This creates in part the disproportionate number of buyers and sellers in the industry and provides a barrier to entry (O'Connor and Faille 93). Secondly, exit from the industry is next to impossible, if there was, for whatever reason, no more money to be made in the ski industry. This is because of the large amount of capital tied up in the ski lifts and other vital equipment, along with no relatively similar replacement products that could be produced instead of skiable terrain. Next to last, the idea of a small role of government also doesn't hold up due to the need to get permits to open or expand a resort. Finally, according to O'Connor and Faille, "firms in perfectly competitive industries have no market power." This is clearly not true in the ski industry because there are so few sellers; there is nowhere else for the consumer to turn. All in all there is a lack of free market principles in the ski industry and it does not abide by the directions of the market. In fact reinstating *ceteris paribus* to close out other resorts, Vail Resort is a monopoly of its industry. It is the only producer of its product and there are massive barriers to entry and the resort holds a huge amount of power in the market making the entry and completion of another ski resort nearly impossible. This counters the feasibility of the economic model of the supply of snowfall and the demand for ski tickets because the price is based on the whim of the producer and is not acted upon by market forces. This explains why there is no intersection of the supply and demand curves in Figure 2 on page 7. If the resort is setting prices without market input then the price supplied will also be somewhat constant, again as shown in Figure 2 on Page 7. All of this is detrimental to the idea of the economic representation of Vail Resort.

The most important part of the economic model of Vail Resort is the possible applications of the ideas based on it. According to the data one can draw three conclusions: First that there is no real relationship between supply of snowfall and demand for ski tickets, second that there is a correlation between the previous year snowfall and the ticket sales of the next year, and finally that there is a possible relationship between the number of days with a large amount of snowfall in a season and the number of tickets sold. Starting off, the lack of a relationship between supply of snowfall and demand of ski tickets implies that Vail Resort need not worry about how much snowfall is received in a given season because the number of tickets sold is not dependent on that number. This is good for both employees and shareholders of the company because they can expect consistent paychecks and returns, respectively. Next, the direct correlation between the amount of snowfall of a previous year and the number of tickets sold the next year can be used by both visitors and Vail Resort itself. Consumers can use this information to plan trips more effectively. Because there is an influx of visitors in a year after a large amount of snowfall, smart visitors will avoid the crowd by buying tickets for a year after a low amount of snowfall. This benefits the consumer by increasing utility and the resort by increasing revenue by a small amount. The resort can also use this information to plan for busier seasons by working to accommodate a larger than anticipated crowd, again increasing the utility of the consumer. Finally, Vail Resort can account for diminishing marginal utility based on how many days of large snowfall occur in a given year. Based on this data, the larger number of days with high snowfall, a diminishing number of ticket sales can be expected for each one. This could help the resort not overstaff and save money,

leading to more profits over the long run, which is beneficial to all the parties that are involved.

## Conclusion:

From the evidence gathered from the data and the economic analysis of the issues of Vail Resort, it is clear that an economic model of Vail Resort is neither useful nor applicable. The major issue is that although it provides insights into season-wide patterns of ticket sales, it does not account for all of the real world variables involved in the demand for ski tickets. Although there still seems to be a supply and demand relationship between snowfall and the number of tickets sold, it is impossible to know because of the skewed data and the monopolistic price impositions on the tickets. The data is skewed by the externalities due to the snowfall in previous seasons as well as the income elasticity of demand. This is because as average family's disposable income decreases, skiing is one of the first luxury goods that they decide to do without. The only evidence supporting the idea of an economic model based on snowfall and ticket sales is the series of externalities, the application of the Law of Diminishing Utility, and the application of the Circular Flow model. With this semblance of a model, inferences can be made about the long term behavior of Vail Resort, but no short term predictions can be made because the market is too volatile. It seems that there is not a practical way to find a relationship between the supply of snow and the demand for ski tickets that will allow for an economic model of the ski industry.

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